

# AIR MINISTRY

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Air Navigation Act, 1920.

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**THE AIR NAVIGATION DIRECTIONS,  
1932 (A.N.D. 11),  
issued by the Secretary of State for Air  
under Art. 30 of the Air Navigation  
(Consolidation) Order, 1923**

AIR MINISTRY,  
*2nd September, 1932*



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## AIR NAVIGATION ACT, 1920

## DIRECTIONS

These Directions are issued under Article 30 of the Air Navigation (Consolidation) Order, 1923 (which Order, as amended by subsequent Orders, is hereinafter referred to as "the Order") which provides that the Secretary of State may issue such directions as he thinks fit for the purpose of supplementing or giving full effect to the provisions of the Order, including the Schedules thereto.

These Directions replace the Air Navigation Directions, 1930 (A.N.D. 10), the Air Navigation Directions, 1931 (A.N.D. 10A), and the Air Navigation Directions, 1931 (A.N.D. 10B), all of which are hereby revoked.

**SECTION I.—REGISTRATION OF AIRCRAFT**

1. With reference to Article 3 (1) (i) of the Order and Schedule I thereto, applications for the registration of aircraft in Great Britain and Northern Ireland should be made to the Secretary (D.C.A.), Air Ministry, London, W.C.2, by whom application forms will be supplied on request.

**SECTION II.—CERTIFICATES OF AIRWORTHINESS****A.—General**

2. With reference to Article 3 (1) (ii) of the Order and Schedule II thereto, applications for certificates of airworthiness should be made to the Secretary (D.C.A.), Air Ministry, London, W.C.2, by whom application forms will be supplied on request.

3. In this Section, unless the context otherwise implies, the terms "aircraft", "flying machine", "airship" and "balloon" include respectively the aircraft, flying machine, airship or balloon and all equipment.

4. *Type Design*.—A design of aircraft which is of a new type, or which, in the opinion of the Secretary of State, differs in essential particulars affecting the safety of the aircraft from previously approved designs, will be classified as a "type design".



5. *Type Aircraft*.—The first aircraft constructed in accordance with a type design, in respect of which an application is made for a certificate of airworthiness, will be classified as a "type aircraft".

6. *Subsequent Aircraft*.—An aircraft which, in the opinion of the Secretary of State, conforms in all essential respects affecting the safety of the aircraft with a type aircraft in respect of which a certificate of airworthiness has been issued by the Secretary of State, will be classified as a "subsequent aircraft".

## B.—Approval of Design

7. To obtain approval of design, there are two alternative methods of procedure, viz. :—

Method I.—Applicable to type aircraft designed by persons or firms recognised by the Secretary of State as persons or firms from whom he is prepared to accept reports under paragraph 5 of Schedule II to the Order in respect of the design of type aircraft of the kind in question.

Method II.—Applicable to type aircraft designed by persons or firms not so recognised.

### *Method I*

8. An application for a certificate of airworthiness should be made at a very early stage in the design of the aircraft. Until such an application has been received, action by the representatives of the Secretary of State as regards the design of the aircraft will not be authorised.

9. During the course of the design of the aircraft all design data, calculations, reports on tests, and drawings shall be held at the disposal of the representatives of the Secretary of State for examination, as also shall be the aircraft during its construction.

10. If, in the opinion of the Secretary of State, the aircraft is one to which the assumptions usually made, or the methods usually employed, for the purpose of checking in detail the safety of aircraft are not strictly applicable, then—

(a) The Secretary of State may require the designer to provide satisfactory evidence, based on wind channel tests or otherwise, as to the distribution of loads on the components of the aircraft.

(b) If, in the opinion of the Secretary of State, strength tests are necessary to demonstrate that the aircraft complies with specified strength standards, the designer will be required to carry out such tests as may be prescribed by the Secretary of State.

11. At any time prior to the issue of the certificate of airworthiness, the constructor may be required to make any modifications to the aircraft which are considered by the Secretary of State to be necessary for safety. Before, however, such modifications are carried out, full drawings and particulars thereof must be placed at the disposal of the representatives of the Secretary of State for examination.

12. After completion of the aircraft and of the flying trials required by paragraph 24, the designer will be required to furnish the Secretary of State with copies of such design data, calculations, reports on tests, and drawings as may be required by the Secretary of State to such number and in such form as may be required by him and also with a report in the following form :—

Report by Designer of

Aircraft type (Name and Description).....

Constructor's No.....

Nationality and Registration Marks (if any).....

Classification : Categories.....Subdivisions.....

I/We the designer(s) of the above aircraft hereby report and certify that :—

(a) Except as stated at (i) below, the design of the above aircraft fulfils the requirements, other than those relating to tests in flight, prescribed for aircraft of the above categories and subdivisions in the Airworthiness Handbook for Civil Aircraft (A.P.1208) and such other requirements relating to the above aircraft as may have been notified to me/us in writing by or on behalf of the Secretary of State.

(b) Except as stated in (ii) below, the load factors of the above aircraft have, throughout the course of its design, been determined by the official methods laid down in the Handbook of Strength Calculations (A.P.970).

(c) The calculations made during the course of the design of the above aircraft have been checked in a manner which has been approved by the Secretary of State, and every reasonable precaution has been taken to ensure arithmetical accuracy.

(d) The design data, calculations, reports on tests, and drawings furnished by me/us to the Secretary of State in accordance with paragraph 12 of the Air Navigation Directions, 1932 (A.N.D.11) are a true and accurate record of the design of the above aircraft.

(i).....

.....

.....

(ii).....

.....

.....

(Signed).....

Date.....

### *Method II*

13. After forwarding to the Secretary (D.C.A.), Air Ministry, an application form duly completed for a certificate of airworthiness for a type aircraft, the applicant shall submit to the Airworthiness Department, Royal Aircraft Establishment, South Farnborough, Hants., general arrangement drawings of the proposed aircraft, together with such particulars as may be required by the Secretary of State to enable him to form a preliminary opinion as to the general safety of the aircraft.

14. The applicant shall submit subsequently such drawings and particulars of the proposed aircraft as may be required by the Secretary of State for checking in detail the safety of the aircraft. These drawings and particulars should, as far as possible, be in accordance with C.A. Forms which will be supplied, on application, by the Airworthiness Department. Fully dimensioned sketches in duplicate may be sufficient to enable the checking to be proceeded with.



15. If, in the opinion of the Secretary of State, the aircraft is one to which the assumptions usually made, or the methods usually employed, for the purpose of checking in detail the safety of aircraft are not strictly applicable, then—

(a) The Secretary of State may require the applicant to provide either—

- (i) satisfactory evidence, based on wind channel tests or otherwise, as to the distribution of loads on the components of the aircraft, or
- (ii) a model of the aircraft, either complete or with such omissions as the Secretary of State may require, and capable of such adjustments as he may require, suitable for tests in a wind channel so as to determine the distribution of loads, or
- (iii) such working drawings and data as may be required by the Secretary of State to enable such a model as aforesaid to be constructed for aerodynamic test ; and

(b) If, in the opinion of the Secretary of State, strength tests are necessary to demonstrate that the aircraft complies with specified strength standards, the applicant will be notified as to the number, nature and conditions of such tests and required to supply and deliver, as directed by the Secretary of State, the necessary components and/or test specimens for this purpose. Should such tests reveal defects in the design, the applicant will be required to modify the design of the defective part or parts, and, if considered necessary by the Secretary of State, to supply further test specimens to demonstrate the adequacy of the modifications.

16. Except as provided for in paragraphs 15, 17 and 30, no modifications which, in the opinion of the Secretary of State, affect the safety of the aircraft, may be made subsequent to the submission of the particulars and drawings required under paragraphs 13 and 14, or subsequent to the provision or delivery of any matters required under paragraph 15 unless details of such modifications have been submitted to the Airworthiness Department and approved. Consideration of any modifications so submitted may, at the discretion of the Secretary of State, be made subject to the submission of a fresh application for a certificate of airworthiness, and if they are of a major character a fresh application will normally be required.

17. At any time during the consideration of the application the applicant may be required to make any modifications to the aircraft which are considered by the Secretary of State

to be necessary for safety. Before, however, such modifications are carried out, full drawings and particulars thereof must be submitted to the Airworthiness Department, and approved.

18. The applicant may proceed with the construction of any part or parts of the aircraft as and when the drawings of such part or parts are approved.

**C.—Approval of Workmanship and Materials : Inspection during Construction : Final Inspection**

*Type Aircraft*

19. (a) Inspection of type aircraft will be carried out by the Secretary of State, but the inspection of all details and components of such aircraft shall be carried out by the constructor, who shall provide adequate inspecting staff for this purpose. In addition, each component shall be finally inspected and approved by the Secretary of State.

(b) Constructors shall notify the Director of Aeronautical Inspection seven days before commencing work on any part of the aircraft the inspection of which is necessary during process of construction.

(c) All materials used in the construction of the aircraft shall be in accordance with the specifications approved for the type design, and every batch of such material shall be proved to comply with such specification by suitable examination, sampling and testing by approved methods.

(d) Every detail and part must be proved by the constructor's inspecting staff referred to in (a) of this paragraph by suitable process of testing and inspection to conform strictly to the approved type design. The constructor's inspecting staff shall stamp, or otherwise provide means for the identification of, each detail and part approved by them for incorporation in the aircraft, in such a way that the individual responsible for such approval can subsequently be identified.

(e) Only details and parts which have been approved in accordance with (d) of this paragraph or details or parts for which special "concessions" have been granted as laid down in paragraph 21 may be issued by the constructor to the shops for assembly into components.

(f) The constructor shall maintain an efficient process inspection during the work of assembly, and record the progress of such inspection for each component. Every component shall be finally inspected and approved by a qualified member of his inspection staff, who shall stamp the component in such a way that he may afterwards be identified as the person responsible, and shall also sign the inspection record.



(g) Operations such as heat treatment of steels, seasoning and conversion of timber, glueing of important parts, doping, etc., must be carried out by approved methods.

(h) The constructor shall ensure that all components and parts obtained from sub-contractors have been inspected and approved in accordance with these conditions.

(i) The constructor (of the aircraft or engine, as may be arranged) shall ensure that all engines have been inspected and approved in accordance with these conditions and have undergone, to the satisfaction of the Secretary of State, such tests as may be required by him. The constructor shall provide adequate facilities for these tests.

(j) The constructor shall satisfy the Secretary of State that the specified instruments and equipment have been manufactured, and any repairs thereto executed, under approved conditions, and that such instruments comply with current specifications approved by him.

(k) The aircraft constructor shall ensure by suitable inspection that all engines, instruments and parts (including wiring for electrical equipment other than wireless apparatus) that are fitted into the aircraft are so installed as to function correctly, and, if wireless telegraphy or wireless telephony apparatus is fitted, that the installation of such apparatus, including bonding and screening, is not such as to prejudice the operation of the aircraft and is in conformity with such requirements as may have been laid down by the Secretary of State. The individuals responsible for such inspection shall be indicated by signatures on the inspection record referred to in (f) of this paragraph.

(l) On completion of the construction of the aircraft and of flying trials under paragraph 24, but before the carrying out of any official flying trials under paragraph 25, a final inspection of the aircraft as regards its fitness for flight shall be made by the Secretary of State.

(m) On completion of the whole of the inspection operations specified above, the constructor shall forward to the Secretary, Air Ministry, a summary of the inspection record of the aircraft. For this purpose A.M. Form 1221 (copies of which can be obtained on application) shall be used. All the particulars required by the Form must be given.

#### *Subsequent Aircraft*

20. (a) Inspection of subsequent aircraft, including all such inspection as was carried out in the case of the type aircraft by the Secretary of State, will be carried out by the constructor's inspecting staff.

(b) The constructor shall fulfil the conditions specified in paragraph 19, sub-paragraphs (c) to (k) inclusive.

(c) The constructor shall satisfy the Secretary of State that his inspecting staff are such as to ensure that aircraft passed by them conform in all essential respects to the type aircraft.

(d) On completion of the construction of the aircraft and of flying trials under paragraph 28, a final inspection of the aircraft as regards its fitness for flight shall be made by a representative or representatives of the constructor holding ground engineer's licences in Categories A and C for the type of aircraft concerned, and, if the result of this inspection warrants it, a certificate of fitness for flight, in a form satisfactory to the Secretary of State, shall be furnished to him.

(e) On completion of the whole of the inspection operations specified above, the constructor shall forward to the Secretary of State a summary of the inspection record of the aircraft. For this purpose, A.M. Form 1221 (copies of which can be obtained on application) shall be used, and a separate form employed for each aircraft. All the particulars required by the Form must be given.

### *Concessions*

21. (1) For the purpose of this section of these Directions a "concession" means permission to use a limited quantity of material or a limited number of details or parts which have been incorrectly manufactured but are not unserviceable.

(2) Concessions may be granted by the constructor's inspecting staff referred to in (a) of paragraph 19 subject to the following conditions and limitations :—

(a) Concessions shall be recorded in some permanent form which shall be to the satisfaction of the Secretary of State. Each concession shall be numbered serially, and the record shall include full particulars of the concession and state the quantity of material or the number of details or parts covered by the concession.

(b) Where practicable the details or parts affected by a concession shall be specially marked in some way for the purpose of identification.

(c) No concession affecting either strength or functioning may be granted unless full details of the intended concession have been submitted to the Secretary of State and his approval thereto has been obtained.



### *Special Inspection Arrangements*

22. When the constructor does not possess adequate facilities or adequate staff or is for any other reason unable to fulfil all or any of the requirements of paragraphs 19 and 20, other arrangements for fulfilling these requirements may be sanctioned by the Secretary of State.

### **D.—Instruments and Equipment\***

23. With reference to paragraphs 2 and 5 of Schedule II to the Order, the instruments and equipment with which an aircraft is required to be fitted for the purpose of the issue of a certificate of airworthiness are, in the cases indicated, as follows:—

- (1) Flying machines.
  - Air speed indicator.
  - Altimeter.
  - Such gauges as are considered necessary by the Secretary of State for the particular installation.
  - Revolution indicator.
- (2) Airships.
  - (i) In all cases:—
    - Air speed indicator.
    - Altimeter.
    - Such gauges as are considered necessary by the Secretary of State for the particular installation.
    - Revolution indicator.
    - Fore-and-aft level.
    - Manometer for each gas-bag or ballonette.
    - Statoscope.
  - (ii) In the case of airships of or exceeding a designed capacity of 700,000 cubic feet:—
    - Distant reading gas and air temperature thermometer.
- (3) Free balloons.
  - Altimeter.
  - Statoscope.

The instruments and equipment must be of approved types.

### **E.—Flying Trials**

#### *Type Aircraft*

24. On completion of the aircraft and of any modifications which may have been required under paragraph 11 or paragraph 17 as the case may be, flying trials will be carried out by the applicant's or constructor's pilot in the presence of representatives of the Secretary of State.

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\* As regards the instruments and equipment required to be carried by British aircraft when flying, see Section VIII.



25. After the satisfactory completion of the flying trials provided for in paragraph 24, and, in the case of aircraft approval of whose design is being dealt with under Method I, after the receipt and acceptance by the Secretary of State of a report under paragraph 12, the aircraft (if other than a balloon) shall be held at the disposal of the Secretary of State for official flying trials. These trials will take place at an aerodrome selected by the Secretary of State, which will normally be, for landplanes, the Aeroplane and Armament Experimental Establishment, Martlesham Heath, Woodbridge, Suffolk, and for seaplanes, the Marine Aircraft Experimental Establishment, Felixstowe, Suffolk. Except in the case of an airship, the trials will be carried out by the Secretary of State. In the case of an airship they will be carried out by the applicant or constructor with a representative of the Secretary of State on board, and so that such representative has full facilities for satisfying himself as to the control of the airship in the air.

26. The Secretary of State will not be liable for any loss or damage caused to the aircraft while in his custody for the purpose of official flying trials or in the course of transit to or from the aerodrome selected.

27. If, after flying trials under paragraphs 24 and/or 25 have been carried out, any modification is made to the aircraft (whether under paragraph 11 or paragraph 17 or otherwise) compliance afresh with paragraphs 24 and/or 25 may be required.

#### *Subsequent Aircraft*

28. After completion of the aircraft, flying trials will be carried out by the applicant's or constructor's pilot under approved arrangements.

### **F.—Issue of Certificate, etc.**

#### *Type Aircraft*

29. On the completion of the official flying trials, the applicant will be supplied with a report on the trials.

30. On the satisfactory completion of official flying trials (or, in the case of a balloon of the trials under paragraph 24) and after completion to the satisfaction of the Secretary of State of any modifications considered necessary for safety, and subject to compliance with paragraph 23, a certificate of airworthiness will be issued.

*Subsequent Aircraft*

31. Following the receipt by the Secretary (D.C.A.), Air Ministry, of an application form duly completed, a certificate of airworthiness will be granted subject to compliance with paragraphs 20, 23 and 28.

**G.—Weight**

32. Every flying machine shall be weighed to the satisfaction of the Secretary of State :—

(a) Before a certificate of airworthiness is issued in respect thereof ; and

(b) At such times after the issue of a certificate of airworthiness as the Secretary of State may require.

33. Every flying machine for which a certificate of airworthiness is for the time being in force shall bear clearly painted upon it in a prominent position—

(a) Its weight empty (including water in radiators), as ascertained at its last previous weighing ; and

(b) The maximum total weight authorised for it, as shown for the time being in its certificate of airworthiness ; and shall carry displayed in a prominent position inside it a weight schedule showing what items of equipment (if any) are included in the “weight empty (including water in radiators)” as painted on it.

**H.—Modifications subsequent to issue of Certificate**

34. If at any time the Secretary of State considers modifications to an aircraft, in respect of which a certificate of airworthiness is in force, to be necessary for safety, he may require such modifications to be carried out as a condition of the certificate of airworthiness remaining in force.

35. (1) If modifications (including changes of equipment or its installation) which affect the safety of the aircraft are carried out to an aircraft in respect of which a certificate of airworthiness is in force, then, until the modifications have been approved the aircraft shall not fly except in so far as under the Order it might fly if it had no certificate of airworthiness.

(2) When such modifications are carried out by a person or firm recognised by the Secretary of State as a person or firm from whom he is prepared to accept reports under paragraph 5 of Schedule II to the Order in respect of aircraft of the kind in question, that person or firm shall furnish the Secretary of State with copies of such design data, calculations,



reports on tests, and drawings as may be required by the Secretary of State in such form as may be required by him and also with a report in the following form :—

Report on Modification(s) to

Aircraft Type (Name and Description).....

Constructor's No.....

Nationality and Registration Marks.....

Classification : Categories.....Subdivisions.....

I/We hereby report and certify that :—

(a) I/We have carried out the modifications to the above aircraft which are specified hereunder :

(b) Except as stated at (i) below, these modifications are such that the design of the above aircraft still fulfils the requirements, other than those relating to tests in flight, prescribed for aircraft of the above categories and subdivisions in the Airworthiness Handbook for Civil Aircraft (A.P.1208) and such other requirements relating to the above aircraft and/or the above mentioned modifications as may have been notified to me/us in writing by or on behalf of the Secretary of State.

(c) Except as stated at (ii) below, the load factors of the above aircraft as now modified have throughout the course of the design of the modified components been determined by the official methods laid down in the Handbook of Strength Calculations (A.P.970)\*.

(d) The calculations made during the course of the design of the above mentioned modifications have been checked in a manner which has been approved by the Secretary of State, and every precaution has been taken to ensure arithmetical accuracy.\*

(e) The design data, calculations, reports on tests and drawings furnished by me/us to the Secretary of State in accordance with paragraph 35 (2) of the Air

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\* Strike out this paragraph if not applicable.



Navigation Directions, 1932 (A.N.D. 11) are a true and accurate record of the design of the abovementioned modifications.

Particulars of Modifications.....

.....

.....

(i) .....

.....

.....

(ii) .....

.....

.....

(Signed) .....

Date.....

(3) The requirements of paragraphs 57 and 58 as regards the inspection of modifications and the certification thereof must be complied with.

36. The Secretary of State may, in the case of modifications affecting the structure of the aircraft, the engine, or the installations, or any modifications affecting the navigation of, or the pilot's view while navigating, the aircraft, require in respect of the aircraft proposed to be so modified the submission of an application for a certificate of airworthiness for a type aircraft.

## I.—Classification of Aircraft

### FLYING MACHINES

37. *Principles of Classification.*—Every flying machine for which a certificate of airworthiness is granted will be classified on such certificate as belonging to one of the following Categories, and to one or more of the Subdivisions :—

(1) "Normal" Category :—

Subdivision (a) ; public transport machines for passengers.

Subdivision (b) ; public transport machines for mails.

Subdivision (c) ; public transport machines for goods.

“ Public transport machines ” are defined as those which may be used for flight with passengers, mails, or goods, for remuneration.

Subdivision (d) ; private machines.

“ Private machines ” are defined as those which may be used for purposes other than either the carriage of passengers, mails, or goods for remuneration or any other industrial purpose.

Subdivision (e) ; aerial work machines.

“ Aerial work machines ” are defined as those which may be used for industrial purposes not included in the definition of public transport machines. (These purposes, which may depend on the incorporation of special structural features or equipment, may be limited by the certificate of airworthiness.)

(2) “ Special ” Category :—

Subdivision (f) ; racing or record machines.

“ Racing or record machines ” are defined as those which are specially intended or arranged for the purpose of sporting or technical performances, to the exclusion of any other use.

Subdivision (g) ; research or experimental machines.

“ Research or experimental machines ” are defined as those which are specially intended or arranged for the purpose of experimenting in flight with regard to new apparatus and checking the results thereof, to the exclusion of any other use.

(3) “ Acrobatic ” Category :—

Subdivisions (a) to (g) in the two preceding Categories.

*Notes.*—(i) All machines in the Normal and Special Categories are limited to straight flying, *i.e.*, are precluded from any evolution which might cause abrupt variations in the height or attitude of the machine.

(ii) The flight of machines in the Special Category may be limited, as a precautionary measure, to certain areas and to certain periods.

(iii) Machines in the “ Acrobatic ” Category are not restricted to straight flying.

38. *Classification of individual machines.*—(1) The Category in which a machine may be given a certificate of airworthiness will depend mainly upon its load factors.



(2) The Subdivisions, which are the means of further classifying machines according to the purposes for which they may be used, are defined above.

These definitions are not, however, to be understood as necessarily restricting a machine to use for the purpose of only one subdivision, for, as indicated in paragraph 39 (2), it may be used for the purpose of more than one subdivision, provided that (except in the case mentioned in (3) (i) of this paragraph) the subdivisions concerned are specified on its certificate of airworthiness.

(3) (i) A public transport machine for passengers may be used for the carriage of passengers without remuneration.

(ii) The classification of a machine only under subdivision (d) does not enable it to be used for the purposes of public transport.

(iii) A machine will be classified as an aerial work machine under subdivision (e) for the special purposes for which its structural features and/or equipment are accepted as satisfactory.

39. *Employment of machines.*—(1) A machine may be employed, in any given flight, solely for the purpose of one of the subdivisions in which it is classified on its certificate of airworthiness, provided that in that flight all requirements (including those in respect of the equipment and operation of the machine) which attach to the subdivision concerned are complied with.

(2) A machine may be employed, in any given flight, for the purpose of more than one of the subdivisions in which it is classified on its certificate of airworthiness, provided that in that flight all requirements (including those in respect of the equipment and operation of the machine) which are common to the subdivisions concerned are complied with, and in cases where differences occur between the requirements attached to the subdivisions in question the highest standard is satisfied.

(3) In the event of its being desired to use a machine for purposes of subdivisions other than those stated on its certificate of airworthiness, an application for reclassification should be forwarded to the Secretary, Air Ministry, prior to the machine being used for such purposes. The existing certificate of airworthiness will then be endorsed, or a new certificate issued, if it can be shown that all requirements in respect of the proposed new classification are satisfied.

40. *Application for a certificate of airworthiness.*—When applying for a certificate of airworthiness for a flying machine an applicant should state the proposed category and the purpose or purposes for which it is proposed to employ the machine in question.



## AIRSHIPS AND BALLOONS

41. Paragraphs 37, 38, 39 and 40 apply to airships and balloons as they apply to flying machines, subject to the following modifications :—

- (1) The " Normal " Category consists of the following subdivisions :—
  - (i) Public transport airships and balloons.
  - (ii) Private airships and balloons.
  - (iii) Aerial work airships and balloons.
- (2) The " Special " Category consists of the following subdivisions :—
  - (iv) Racing or record airships and balloons.
  - (v) Research or experimental airships and balloons.
- (3) There is no " Acrobatic " Category.
- (4) References to subdivisions (ii) and (iii) are substituted for references to subdivisions (d) and (e) respectively.

**J.—Renewal of Certificate of Airworthiness**

42. Application for the renewal of a certificate of airworthiness should be made on C.A. Form 79 to the Secretary (D.C.A.), Air Ministry, London, W.C.2, at least one month before the date from which the renewal is required to be effected, in order that the necessary arrangements may be made for the inspection of the aircraft. Copies of C.A. Form 79 may be obtained, on application, from the Secretary, Air Ministry.

**SECTION III.—LICENSING AND DUTIES OF GROUND ENGINEERS**

43. The procedure for the issue of licences to persons desirous of being licensed as competent persons for the inspection, etc., of aircraft in accordance with Schedule II to the Order, and for other purposes in connection with the Order, is as set out below. Persons so licensed are hereinafter referred to as " ground engineers ".

44. A person may be licensed as a ground engineer in any or all of the following categories :—

- A. Inspection of aircraft before flight.
- B. Inspection of aircraft after overhaul.
- C. Inspection of aero-engines before flight.
- D. Inspection of aero-engines after overhaul.
- X. Other duties, as specified in the licence, which, under the Order, are required to be performed by a licensed ground engineer.

45. In order to qualify for the issue of a ground engineer's licence, a candidate—

- (a) Must not be under 21 years of age ;
- (b) Must have passed an examination held by the Secretary of State, or approved by him for the purpose ; and
- (c) Must produce satisfactory proof of practical experience or knowledge in accordance with paragraph 47 below.

Provided, however, that no licence will be granted if the Secretary of State is not satisfied that the applicant is a fit and proper person to hold the licence.

46. Syllabuses of the examinations for the various categories may be obtained on application to the Secretary (D.A.I.), Air Ministry, London, W.C.2.

47. (1) A candidate will be required to have had such practical experience as, in the opinion of the Secretary of State, will enable him to perform satisfactorily the duties for which the licence is required.

(2) For a licence in Category A and/or Category B an applicant will be required to have had practical experience on aircraft maintenance and/or construction.

(3) For a licence in Category C and/or Category D an applicant will be required to have had practical experience on aero-engine maintenance and/or construction.

48. Where a candidate's experience or knowledge is limited to any particular type or types of aircraft or engine, a licence may be granted in respect of such type or types only.

49. Applications for licences should be made to the Secretary (D.C.A.), Air Ministry, London, W.C.2, by whom application forms will be supplied on request. After forwarding to the Secretary, Air Ministry, a completed application form, the applicant will be directed to report to the Director of Aeronautical Inspection, Air Ministry, for examination.

50. Aircraft, engines, etc., certified by licensed ground engineers, and work performed by them within the terms of their licences, will be periodically examined by the Secretary of State, who reserves the right to cancel, suspend or endorse the licences of the ground engineers concerned should it appear to him, as a result of the examination, that such certification or work has not been carried out in a careful and competent manner.

51. The Secretary of State reserves the right to cancel, suspend or endorse the licence of a ground engineer who signs a certificate in a category for which he is not licensed.



52. The Secretary of State may, on sufficient ground being shown to his satisfaction, after due inquiry, cancel, suspend or endorse the licence of a ground engineer in circumstances other than those specified in paragraphs 50 and 51.

53. Ground engineers' licences will be valid for a period of twelve months, and will then be subject to renewal. The holder of a licence who applies for the renewal thereof may be required to satisfy all or any of the requirements which are for the time being applicable on the issue of a ground engineer's licence.

#### **SECTION IV.—INSPECTION AND CERTIFICATION OF AIRCRAFT BEFORE FLIGHT, Etc.**

54. With reference to paragraph 8 of Schedule II to the Order, the inspection thereunder of an aircraft shall be in accordance with the following provisions :—

(a) Inspection of the aircraft (including its instruments and equipment, but exclusive of the engine or engines and engine installation and of the instruments relating thereto) shall be carried out by a ground engineer licensed in Category A in respect of aircraft of the type in question.

(b) In the case of a flying machine or an airship, inspection of the engine or engines and engine installation and of the instruments relating thereto shall be carried out by a ground engineer licensed in Category C in respect of engines of the type or types in question.

(c) The whole of the inspection may be carried out by the same ground engineer, provided that he is licensed both in Category A and in Category C in respect of aircraft and engines of the types in question.

55. The certificate as to the safety of the aircraft for flight required by paragraph 8 of Schedule II to the Order shall be in the following form, or in such other form as may be approved as suitable for the purpose :—

(1) In the case of a flying machine or airship :—

##### **CERTIFICATE OF SAFETY FOR FLIGHT.**

Aircraft Type.....

Nationality and Registration Marks.....

(a) I hereby certify that I have this day inspected the above aircraft (including its instruments and equipment, but exclusive of the engine(s) and engine installation and of the instruments relating thereto), and that I am satisfied that it is safe in every way for flight, provided that the conditions of loading specified in the certificate of airworthiness are complied with.



The time at which this inspection was completed  
was.....

(Signed).....

(Ground Engineer ; Licence No.....).

Date..... Time.....

(b) And I hereby certify that I have this day inspected the engine(s) and engine installation (including the instruments relating thereto) of the above aircraft, and that I am satisfied that they are in every way fit for flight.

The time at which this inspection was completed  
was.....

(Signed).....

(Ground Engineer ; Licence No.....).

Date..... Time.....

(2) In the case of a free balloon :—

CERTIFICATE OF SAFETY FOR FLIGHT.

Free Balloon Type.....

Nationality and Registration Marks.....

I hereby certify that I have this day inspected the above free balloon (including its instruments and equipment), and that I am satisfied that it is safe in every way for flight, provided that the conditions of loading specified in the certificate of airworthiness are complied with.

The time at which this inspection was completed  
was.....

(Signed).....

(Ground Engineer ; Licence No.....).

Date..... Time.....

(3) In the case of a fixed balloon :—

CERTIFICATE OF SAFETY FOR FLIGHT.

Fixed Balloon Type.....

Nationality and Registration Marks.....

I hereby certify that I have this day inspected the above fixed balloon (including its instruments and equipment), and also the winch and cable by which it is operated, and that I am satisfied that it and they are safe in every way for flight, provided that the conditions of loading specified in the certificate of airworthiness are complied with.

The time at which this inspection was completed  
was.....

(Signed).....

(Ground Engineer ; Licence No.....).

Date..... Time.....

56. Copies of certificates under paragraph 8 of Schedule II to the Order shall be dealt with as provided in paragraph 10 of that Schedule.

### **SECTION V.—OVERHAULS, REPAIRS, Etc.**

57. When any aircraft registered in Great Britain and Northern Ireland in respect of which a certificate of airworthiness has been issued or validated by the Secretary of State is overhauled, repaired, or modified, or when any part thereof is replaced, the aircraft shall not again fly (except in so far as under the Order it might fly if it had no certificate of airworthiness) unless and until the following conditions have been complied with :—

(1) In the case of repairs, overhauls or replacements :—

(i) If the certificate of airworthiness was issued by the Secretary of State, the work must be in all essential respects in accordance either with (a) the approved type design in conformity with which the aircraft was constructed, including any modifications to that design or to the aircraft that may have been required by the Secretary of State, or else with (b) any repair scheme issued by the constructors of the aircraft that has been approved by the Secretary of State.

(ii) If the certificate of airworthiness was not issued by the Secretary of State but has been validated by him, the work must be in all essential respects in accordance either with (a) the type design in conformity with which the aircraft was constructed, including any modifications to that design or to the aircraft that may have been required by the duly competent authority responsible for approving the type design, or by the Secretary of State as a condition of the validation of the certificate of airworthiness, or else with (b) any repair scheme issued by the constructors of the aircraft that has been approved by such duly competent authority as aforesaid.



(2) In the case of repairs, overhauls, or replacements, all materials used must be equal to those authorised for the type design in conformity with which the aircraft was constructed.

(3) In all cases all work must be inspected in accordance with the conditions required for the inspection of subsequent aircraft that are applicable to the case.

(4) In all cases a certificate of compliance with the above requirements, in accordance with the terms of paragraph 58, must be given.

Provided that in cases of repairs where it is not reasonably practicable to comply with the above requirements, whether by reason of particulars of the type design not being available or otherwise, a temporary repair may be made for the purpose of enabling the aircraft to proceed directly to the nearest place at which a repair complying with the above requirements can be carried out, and, if the pilot is satisfied that, having regard to the circumstances and exigencies of the case, such repair is adequate for the purpose, the aircraft may then proceed to fly to such place. Provided also that if it is desired that such a temporary repair should remain in service, it shall be treated as a modification requiring approval under paragraph 35, and until such approval has been obtained the aircraft shall not fly except as specified in the preceding proviso or in so far as under the Order it might fly if it had no certificate of airworthiness.

58. (1) Every certificate required under paragraph 57 shall be appended to particulars of the overhaul, repair, modification or replacement to which it relates and shall be in the following form :—

I hereby certify that, in carrying out  
 the { overhaul  
       repair  
       modification  
       replacement

specified above, all the conditions laid down in paragraph 57 of the Air Navigation Directions, 1932 (A.N.D.11), which are applicable thereto, have been complied with.

Signed.....

Date.....

(2) Every such certificate shall be signed by a ground engineer qualified under the terms and conditions of his licence to carry out the overhaul, repair, modification or replacement to which the certificate relates, or by the authorised representative of a firm or company approved for the purpose of

giving such certificates. Provided that if the overhaul, repair or replacement has been carried out at a Royal Air Force aerodrome by Royal Air Force personnel the certificate may be signed by the officer in charge of workshops at that aerodrome.

(3) Such certificates shall, when relating to the aircraft exclusive of the engine or engines, be written in the aircraft log book, and, when relating to the engine or engines, be written in the engine log book. Provided, however, that if the appropriate log book is not at the place where the overhaul, repair, modification or replacement is carried out, the certificate may be given separately from the log book, in which case it shall be pasted in the log book as soon as reasonably practicable and meanwhile shall be kept with the journey log book. Provided further that, in the case of aircraft which are not passenger or goods aircraft and for which aircraft and engine log books are not kept, the certificate shall be entered in some other suitable book and that such book shall be produced on demand for the inspection of the Secretary of State.

59. When damage occurs to the main structure of an aircraft registered in Great Britain and Northern Ireland in respect of which a certificate of airworthiness has been issued or validated by the Secretary of State, the aircraft shall not again fly (except in so far as under the Order it might fly if it had no certificate of airworthiness) until such damage has been repaired in accordance with the requirements of paragraph 57, and to the satisfaction of the person by whom the certificate required under that paragraph is signed.

#### **SECTION VI.—SPECIAL PROVISIONS AS TO EXPERIMENTAL OR TEST FLIGHTS, Etc.**

60. With reference to proviso (a) to Article 3 (1) and proviso (b) to Article 4 (1) of the Order, an aircraft which does not comply with all or any of the conditions mentioned in those provisos may nevertheless fly within Great Britain and Northern Ireland provided that—(a) its flight does not contravene any of the other provisions of the Order; and (b) either its flight is carried out under and in accordance with special permission in writing given by the Secretary of State for the purpose or else is such that either the “A conditions” or the “B conditions” set out below are satisfied.

##### *A Conditions.*

(1) An application for the issue or renewal of a certificate of airworthiness in respect of the aircraft, or an application for approval of modifications under paragraph 35 of these Directions, shall have been duly made to the Air Ministry prior to the flight; and



(2) The aircraft shall be either an aircraft in respect of which a certificate of airworthiness has already been issued by the Secretary of State or else a "subsequent aircraft"; and

(3) The flight shall be carried out solely for the purpose of qualifying for the issue or renewal of a certificate of airworthiness or otherwise solely for the purpose of experiment or test; and

(4) The flight shall take place wholly within three miles of a licensed aerodrome, a Royal Air Force aerodrome, an aerodrome under the control of the Secretary of State, or an aircraft factory; and

(5) The flight shall not have been forbidden by or on behalf of the Secretary of State; and

(6) No part of the flight shall take place over any populous area or concourse of people.

#### *B Conditions.*

(1) The flight shall be carried out solely for the purpose of qualifying for the issue or renewal of a certificate of airworthiness or otherwise solely for the purpose of experiment or test; and

(2) The flight shall be carried out under the control of a person or firm specially approved for the purpose of this provision and subject to any conditions or limitations attached to such approval, and the aircraft shall have been designed and constructed by a person or firm or persons or firms so approved; and

(3) The aircraft shall be marked either (if registered) in accordance with Schedule I to the Order or else in a manner approved for the purpose of this provision; and

(4) No part of the flight shall take place over any populous area or concourse of people.

### **SECTION VII.—FIXED BALLOONS**

61. With reference to Article 4 (2) of the Order, whereby fixed balloons may not be flown within Great Britain and Northern Ireland except with the special permission in writing of the Secretary of State, applications for such permission should be made to the Secretary (D.C.A.), Air Ministry, London, W.C.2. They should include in each case a description of the balloon and state where and when it is desired to be flown.

62. The conditions normally attached to such permissions include the following:—

(1) The flying ground from which the balloon is flown shall be such that in every direction from the winch to which the cable of the balloon is attached there is a distance free from obstruction of at least 100 yards.

(2) The balloon shall not be left unattended either by day or night unless it has been hauled down, and either has been "bagged" down or has had its ripping panel made fast to the ground.

(3) The winch to which the cable of the balloon is attached and the cable shall be of approved types.

(4) The person in charge of the winch shall be a ground engineer licensed in Category X for this duty.

### **SECTION VIII.—INSTRUMENTS AND EQUIPMENT TO BE CARRIED BY BRITISH AIRCRAFT\***

63. With reference to Article 14 of the Order, the instruments and equipment to be carried and maintained in working order in British aircraft registered in Great Britain and Northern Ireland, when flying, are, in the cases indicated, as follows:—

(1) Flying machines.

(i) In all flying machines:—

(a) For all flights:—

The instruments specified in (1) of paragraph 23.

Safety belt for each person (including the pilot) carried in an open cockpit, and for the pilot or pilots, whether carried in an open cockpit or not.

(b) For flights which extend beyond a radius of three miles from the point of departure:—

Equipment, as required by the circumstances of the case, for making the signals prescribed for aircraft in Section II of Schedule IV to the Order.

(c) For flights by night:—

Navigation lights.

Illumination for instruments and equipment.

(ii) In amphibian flying machines:—

Indicator of position of landing wheels.

(iii) In flying machines carrying passengers or goods for hire or reward:—

(a) For flights which extend beyond a radius of 20 miles beyond the point of departure:—

Compass.

Watch.

Turn indicator, except for flying machines in which the number of seats (including those for the crew) as shown in the certificate of airworthiness is not more than five.

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\* As regards the instruments and equipment required to be fitted for the purpose of the issue of a certificate of airworthiness, see paragraph 23.



Map or maps to cover the whole route of the proposed flight.

(b) For flights on which, under Section XI of these Directions, a licensed navigator is required to be on board :—

Drift indicator, except for flying machines in which the number of seats (including those for the crew) as shown in the certificate of airworthiness is not more than five.

(c) For flights on which a licensed navigator other than the pilot is on board :—

Chart table.

Navigation instruments.

Also when the pilot's instruments are not readily visible to the navigator ;

Second air speed indicator.

Second altimeter.

Second compass.

(d) For flights at any point of which the machine is more than ten miles from the nearest land :—

Life belt for each person on board.

(e) For flights by night :—

Landing lights (lamps or wing tip flares).

(2) Airships.

(i) For all flights :—

The instruments specified in (2) of paragraph 23.

Watch.

Compass.

Drift sight.

Map or maps to cover the whole of the proposed flight.

Chart table.

Navigation instruments.

Equipment, as required by the circumstances of the case, for making signals prescribed for aircraft in Section II of Schedule IV to the Order.

(ii) For flights by night :—

Navigation lights.

Illumination for instruments and equipment.

(iii) For flights at any point of which the airship is more than ten miles from the nearest land :—

Life belt for each person on board.

(3) Balloons.

(i) Free balloons carrying passengers for hire or reward :—

(a) For all flights :—

The instruments specified in (3) of paragraph 23.

Compass.

Watch.

Map or maps to cover the whole route of the proposed flight.

Equipment, as required by the circumstances of the case, for making the signals prescribed for aircraft in Section II of Schedule IV to the Order.

(b) For flights by night :—

Navigation lights.

Illumination for instruments and equipment.

(c) For flights at any point of which the balloon is more than ten miles from the nearest land :—

Life belt for each person on board.

(ii) Free balloons not carrying passengers or goods for hire or reward :—

(a) For all flights :—

The instruments specified in (3) of paragraph 23,

(b) For flights by night :—

Navigation lights.

(iii) Fixed balloons.

(a) For all flights :—

The instruments specified in (3) of paragraph 23.

(b) For flights by night :—

Lights as prescribed in paragraph 10 (1) of Schedule IV to the Order.

64. With regard to paragraph 63 :—

(a) The instruments and equipment must be of approved types.

(b) The expression " flight by night " means a flight any part of which takes place between sunset and sunrise.

## SECTION IX.—WIRELESS APPARATUS

65. With reference to Article 14A of the Order, every British aircraft registered in Great Britain and Northern Ireland and capable of carrying ten or more persons including the crew shall, when carrying passengers or goods for hire or reward, carry apparatus for wireless telegraphy capable of sending and receiving morse or spoken messages by wireless telegraphy, which is of a type approved by the Secretary of State, and the installation of which (including bonding and screening) is in accordance with requirements laid down by him.

66. Such apparatus shall be operated under the conditions defined by the International Radio-telegraph Convention of Washington.

67. The installation and use by wireless telegraphy stations of spark waves (types B of the General Regulations annexed to the International Radio-telegraph Convention of Washington), is prohibited on board aircraft.



68. The application of the regulations in this Section of these Directions may be suspended when, owing to the absence of land wireless telegraphy organisations available for air traffic, the employment of apparatus for wireless telegraphy on board aircraft would serve no useful purpose.

69. In this Section of these Directions :—

References to the number of persons which an aircraft is capable of carrying, relate to the number of persons for whom seating accommodation is normally provided in the aircraft as shown in its certificate of airworthiness.

The expression "wireless telegraphy" has the same meaning as in the Wireless Telegraphy Acts, 1904 to 1926.

*Note.—Air Navigation Directions regulating the use of apparatus for wireless telegraphy will shortly be issued, dealing inter alia with the nature of apparatus to be carried, the issue of certificates and licences to operators, regulations as to operators and conditions of working and inspection of apparatus, with particular reference to wireless ground engineers.*

*These new regulations will, when established, supersede Section IX of these Directions.*

## SECTION X.—LOG BOOKS

70. With reference to Schedule III to the Order, applications for the issue of journey log books should be made, accompanied by the prescribed fee, to the Secretary (D.C.A.), Air Ministry, London, W.C.2. Such books will be issued only in respect of individual aircraft, and the first page of each book will be completed by the Air Ministry before issue.

In the case of aircraft other than airships and balloons, the book will be in the form of C.A. Form 26.

71. Aircraft log books other than for airships and balloons, engine log books, and pilot's log books shall, respectively, be, in all essentials, in the form of the following authorised patterns, viz., the Aircraft Log Book (C.A. Form 27), the Engine Log Book (C.A. Form 28) and the Pilot's Log Book (C.A. Form 24), all published by His Majesty's Stationery Office.

Aircraft log books for airships and balloons and log books for winches of fixed balloons shall be in such forms as may be approved by the Secretary of State.

72. Entries in journey log books, other than those made by the Air Ministry before issue and any visas by aeronautical or customs authorities, shall be made and signed by the person or persons whose signature is required by the particular form of log book which is being used.

73. Journey log books shall be kept so as to furnish all the information and particulars for which they provide, and the Instructions for Use set out therein shall be complied with.

Provided, however, that where Journey Log Book C.A. Form 26 is used :—

(i) The use of the left hand pages is optional.

(ii) When an aircraft is engaged in a number of flights upon the same day on all of which it returns to the point of departure after a flight of less than thirty minutes, entries in respect of the whole of such flights may be included on a single right hand page of the log book. In that event the actual number of flights so included and the total duration of these flights shall be shown.

74. Entries in aircraft and engine log books other than the original entries :—

(a) In the case of a certificate under paragraph 58 shall be made and signed in accordance with that paragraph.

(b) In other cases shall be made and signed by a licensed ground engineer, except that, as regards matters which could not have come to the notice of a licensed ground engineer, the entries shall be made and signed by the pilot.

75. (a) Aircraft log books, other than for airships and balloons, engine log books and pilot's log books shall be kept so as to furnish all the information and particulars provided for in the authorised patterns referred to in paragraph 71, and the Instructions for Use set out in such authorised patterns shall be complied with, subject to these Directions.

The term "repairs" in the authorised patterns shall be deemed to include all overhauls, replacements, repairs and work of a like nature.

(b) Aircraft log books for airships and balloons and log books for winches of fixed balloons shall be kept in such manner as the Secretary of State may require.

(c) When repairs to an aircraft or engine have been required in consequence either of damage caused by a forced landing or of defects which have occasioned a forced landing, the entry of such repairs made in the aircraft or engine log book shall state that they have been so required and shall identify the forced landing in question by referring to the entry thereof contained in the journey log book.

76. Entries in the journey log book and the pilot's log book shall be made at latest within 24 hours after the events to which they relate, and the relevant particulars in the journey log book shall be entered in the aircraft or engine log book at latest within 24 hours after the return of the aircraft to its station.



## SECTION XI.—PERSONNEL TO BE CARRIED BY BRITISH AIRCRAFT

77. With reference to Article 13A of the Order, the provisions contained in paragraphs 78 to 81 shall apply to British aircraft registered in Great Britain and Northern Ireland.

### *Navigators*

78. A navigator who holds a first or second class licence shall be on board—

(1) Every flying machine used for the international carriage of passengers or goods for hire or reward and having to fly without landing—

(a) more than 100 miles over inhabited regions, or more than 100 miles but not more than 625 miles entirely over the high seas or uninhabited regions ;  
or

(b) by night, more than 16 miles but not more than 625 miles ; and

(2) Every airship of less than 700,000 cubic feet capacity, for every flight by day or by night.

79. A navigator who holds a first class licence shall be on board—

(1) Every flying machine used for the international carriage of passengers or goods for hire or reward and having to fly without landing—

(a) more than 625 miles entirely over the high seas or uninhabited regions ; or

(b) by night, more than 625 miles ; and

(2) Every airship of 700,000 cubic feet capacity or more, for every flight by day or by night.

80. (1) A flying machine pilot who holds the necessary navigator's licence may, even if he is alone on board, fulfil the duties of navigator—

(a) in the case of day flights over inhabited regions,  
or

(b) in the case of day flights of not more than 625 miles over the high seas or uninhabited regions, or

(c) in the case of night flights over routes suitably marked and recognised as such by the competent authorities.

(2) Unless a second pilot is on board, who can in case of need take charge of the flying machine, a flying machine pilot shall not perform the functions of navigator, either on a continuous flight of more than 625 miles over the high seas or uninhabited regions, or (except in the case provided for in sub-paragraph 1 (c) of this paragraph) on a flight by night.

(3) When, in addition to the pilot, an aircraft is required to have on board another member of the crew, the latter, if he holds the necessary navigator's certificate, may fulfil the duties of navigator in the cases provided for in paragraphs 78 and 79.

81. For the purpose of paragraphs 78 to 80—

(a) The expression an "uninhabited region" means a region where, in consequence of the sparsity of the population, and of the absence of natural landmarks or of the insufficiency of the maps, the difficulties of navigation are similar to those met with over the high seas.

(b) The expression "night" means the period commencing one hour after sunset and terminating one hour before sunrise.

(c) The expression "a flight over the high seas" means a flight in the course of which an aircraft finds itself over the sea at a distance of more than 65 miles from the nearest point of the coast.

(d) References to the carriage of passengers or goods for hire or reward include references to the carriage of passengers or goods (whether for hire or reward or not) on behalf of an air transport undertaking.

## SECTION XII.—LICENSING OF PERSONNEL

### A.—General

82. With reference to Article 3 (1) (iii) of the Order and Schedule V thereto, applications for the grant or validation of licences under that Schedule should be made to the Secretary (D.C.A.), Air Ministry, London, W.C.2, by whom particulars of the requirements for obtaining a licence and application forms will be supplied on request.

83. Licences remain valid for the following periods :—

(a) Pilot's licence to fly aircraft carrying passengers or goods for hire or reward or being flown for any industrial purpose : not more than six months where the holder is of the male sex, and not more than four months where the holder is of the female sex.

(b) Any other pilot's licence : not more than twelve months.

(c) Licence to navigate aircraft : not more than six months where the holder is of the male sex, and not more than four months where the holder is of the female sex.

84. In this Section, references to carrying passengers or goods for hire or reward include references to carrying passengers or goods (whether for hire or reward or not) on behalf of an air transport undertaking.



## B.—Medical Requirements

### *Private Pilot's Licence*

85. A person applying for the grant of a pilot's licence to fly aircraft other than aircraft carrying passengers or goods for hire or reward or being flown for any industrial purpose (*i.e.*, a Private Pilot's Licence, as referred to in paragraphs 98 and 101 hereof) will be required to undergo a medical examination by a duly qualified medical practitioner, who may be the applicant's usual medical attendant. Such examination shall be conducted in accordance with C.A. Form 61, and a copy of that form, completed as required, shall be forwarded by the medical examiner to The Secretary (D.C.A.), Air Ministry, London, W.C.2 (by whom copies of the form will be supplied on application).

86. This medical examination will be based upon the following requirements of mental and physical fitness:—

(a) Good family and personal history, with particular reference to nervous stability, as to which information shall be given in a statement made and signed by the applicant and satisfactory to the medical examiner.

(b) The applicant must not be under seventeen years of age.

(c) *General Surgical Examination.*—The applicant must neither suffer from any wound or injury, nor have undergone any operation, nor possess any abnormality, congenital or acquired, which might interfere with the safe handling of aircraft under ordinary conditions.

Palpation of the abdomen and abdominal viscera, particularly the pyloric, vesicular, duodenal and appendicular regions, whenever it reveals any swelling or distinct pain, must be completed by a radioscopic and radiographic examination.

Any surgical intervention in the biliary passages or the digestive tube, except appendicitis, involving a total or partial excision or a diversion of one of these organs, any anatomical lesion in the walls of any part whatever of the digestive tube, any stricture of its calibre, any calculus or foreign body, any peritoneal lesion, established by clinical or laboratory examinations, will entail rejection, unless two years after a surgical operation the effects of the operation are not deemed liable to cause sudden incapacity in the air. Exception may be made for spasmodic strictures not accompanied by other troubles, and for ptoses compensated by a good abdominal musculature.

Diseases of the liver (including those of the biliary passages) and of the pancreas will in cases where it is deemed necessary be verified by laboratory examination, particularly by radiography as well as by an examination of the blood and of the urine, and will entail rejection only if they afford indication of the existence of a calculus, tumour or lesion involving a persistent impairment of function of these organs.

(d) *General Medical Examination.*—The applicant must not suffer from any disease or disability which renders him liable suddenly to become incompetent in the management of aircraft. He must possess heart, lungs and nervous system in a state to withstand the effects of altitude. He must be free from kidney disease, and must not present any clinical sign of syphilis, nor have any cardiac lesion.

(e) *Eye Examination.*—The applicant must possess, with correction by glasses if necessary, a visual acuity equal to at least 80 per cent. of the normal visual acuity for each eye taken separately, or 90 per cent. for one eye and 70 per cent. for the other, the visual acuity being measured by means of standard test types powerfully illuminated in such a manner that the light does not shine directly into the eyes of the examinee. Binocular vision, ocular poise, the field of vision of each eye and colour perception must be normal.

(f) *Ear Examination.*—The middle ear must be healthy. The applicant must possess an auditory acuity not less than that corresponding with the perception of the whispered voice at one metre. The vestibular mechanism must be intact and not hypersensitive. It must be equal on both sides.

(g) *Nose, Throat and Mouth Examination.*—The applicant must possess free tubal air entry on both sides. Provided, however, that a person who does not satisfy the above requirements may, at the discretion of the Secretary of State, be accepted as eligible for the issue of a licence, so far as medical requirements are concerned, if he has previously been found medically fit for flying or if the licence is to be restricted to flying in Great Britain and Northern Ireland.

*Pilot's Licence for Passenger or Goods Flying Machines and Navigator's Licence.*

87. In the following paragraphs 88 to 95, unless the context otherwise requires, the word "licence" means a pilot's licence to fly flying machines carrying passengers or goods for hire or reward or being flown for any industrial purpose or a licence to navigate flying machines.



88. A person applying for the grant of a licence will be required to undergo medical examination as follows :—

(a) A preliminary examination conducted either by a duly qualified medical practitioner, who may be the applicant's usual medical attendant, or by specially qualified medical officers in conjunction with the special examination referred to in (b) below.

(b) A special examination conducted by specially qualified medical officers appointed by or acting under the authority of the Secretary of State.

89. *Preliminary Examination.*—This examination will be based on the following requirements :—

The applicant must have the complete use of his four limbs, must not be completely deprived of the use of either eye and must be free from any active or latent, acute or chronic, medical or surgical, disability, or infection. He must be free from any injury or wound which would entail any degree of functional incapacity which might interfere with the safe handling of aircraft at any altitude even in the case of prolonged or difficult flight. He must be completely free from hernia, must not suffer from any detectable sensory lesion, and must be free from a history of morbid mental or nervous trouble.

Except where the examination is conducted by specially qualified medical officers, it shall be conducted in accordance with C.A. Form 69, and a copy of that form, completed as required, shall be forwarded by the medical examiner to the Secretary (D.C.A.), Air Ministry, London, W.C.2 (by whom copies of the form will be supplied on application).

90. *Special Examination.*—This examination will be based on the following requirements of mental and physical fitness :—

(a) The applicant will be questioned concerning his family and personal history.

(b) *Examination of the nervous system.*—The examination of the nervous system of the applicant shall comprise a full inquiry into family and personal history. The information obtained shall be given in a statement made and signed by the applicant and accompanied, if possible, by a certificate in regard especially to losses of consciousness, fits and convulsions of all kinds, from the applicant's usual medical attendant or a responsible person who has known him for a long time. This statement and this certificate must be deemed satisfactory by the examining medical officer.

The applicant must not present any mental or trophic impairment, pathological tremor, or presumptive evidence of latent epilepsy. Motility, sensibility, tendinous, cutaneous, and pupillary reflexes, co-ordination of

movements and cerebellar functions, must be normal. An exception may be made for local peripheral trouble due to accidental section of a nerve branch.

Fractures of the cranium involving the internal table of the cranial box, even without apparent impairment, will entail temporary unfitness during a period of two years from the date of the fracture.

Any presumed nervous syphilis will entail rejection, unless the non-existence of such an impairment is proved by an examination of the blood and an examination of the cerebro-spinal fluid, made with the consent of the applicant.

(c) Pilots of aircraft carrying passengers or goods for hire or reward and navigators may not enter upon their duties before 19 or after 45 years of age.

(d) *General Surgical Examination.*—The applicant must neither suffer from any wound or injury, nor have undergone any operation, nor possess any abnormality, congenital or acquired, which might interfere with the safe handling of aircraft at any altitude, even in the case of prolonged or difficult flight.

Palpation of the abdomen and abdominal viscera, particularly the pyloric, vesicular, duodenal and appendicular regions, whenever it reveals any swelling or distinct pain, must be completed by a radioscopic and radiographic examination.

Any surgical intervention of the biliary passages or the digestive tube, except appendicitis, involving a total or partial excision or a diversion of one of these organs, any anatomical lesion in the walls of any part whatever of the digestive tube, any stricture of its calibre, any calculus or foreign body, any peritoneal lesion, established by clinical or laboratory examinations, will entail rejection. Exception may be made for spasmodic strictures not accompanied by other trouble and for ptoses compensated by a good abdominal musculature.

Diseases of the liver (including those of the biliary passages) and of the pancreas will in cases where it is deemed necessary be verified by laboratory examination, particularly by radiography as well as by an examination of the blood and of the urine, and will entail rejection only if they afford indication of the existence of a calculus, tumour or lesion involving a persistent impairment of function of these organs.

(e) *General Medical Examination.*—The applicant must not suffer from any disease or disability which renders him liable suddenly to become incompetent in the management of aircraft. His muscular power must be adequate for the handling of the types of aircraft he will have to pilot or the apparatus he is to use.



He must not have any signs of aneurism of the large arterial trunks, nor have any cardiac lesion, even if well compensated; the heart must be normal, with normal function, and only respiratory arrhythmia, increase of pulse rate from excitement or exercise and a general slow pulse not associated with auriculo-ventricular dissociation will be allowed.

The applicant must not suffer from any acute disability of the lungs, nor possess any cicatricial lesion of the lungs, and must be free from tuberculosis capable of being diagnosed by the usual clinical methods, from tracheobronchial disease of the glands, and from pulmonary emphysema, even if slight. In addition, each examination shall include a radioscopic record in doubtful clinical cases.

The applicant must not present any signs of organic disease of the kidneys; these latter must be insensitive to palpation and of normal size. Renal ptosis will entail rejection. The urine must not contain any pathological element. Affections of the urinary passages and of the genital organs, even blennorrhœa, may entail temporary or definitive unfitness.

Applicants of the female sex must present a normal uterus and appendages. Cases in which surgical intervention has taken place will be considered individually. Any presumed pregnancy will entail rejection.

The applicant must not present any clinical signs of syphilis.

Dysentery shall be considered as an acute disease; provided that a presumption of dysenteric infection shall entail rejection, unless the medical examiner considers that the clinical phenomena have disappeared.

(f) *Eye Examination*.—The applicant must possess a degree of visual acuity compatible with the efficient performance of his duties. Binocular vision, ocular poise, the field of vision of each eye and colour perception must be normal.

Pilots must possess, without correction by glasses, visual acuity equal to at least 80 per cent. of the normal visual acuity for each eye taken separately, or 90 per cent. for one eye and 70 per cent. for the other, the visual acuity being measured by means of standard test types powerfully illuminated in such a manner that the light does not shine directly into the eyes of the examinee.

Navigators must possess the same visual acuity, but with correction by glasses if necessary.

(g) *Ear Examination*.—The middle ear must be healthy. The applicant must possess an auditory acuity not less than that corresponding with the normal perception of the tuning forks C (1) 64 vibrations per second, C (3) 256 vibrations per second and C (7) 4,096 vibrations per second, the forks being held perpendicularly to the ground one centimetre from the auditory tube. The vestibular mechanism must be intact and not hypersensitive ; it must be equal on both sides.

(h) *Nose, Throat and Mouth Examination*.—The applicant must possess free nasal and tubal air entry on both sides and must not suffer from serious, acute or chronic affections of the buccal cavity or upper respiratory tract.

91. In the case of persons who have previously been found medically fit for flying, certain relaxations of the requirements set out in paragraph 90 may be made at the discretion of the Secretary of State.

92. A person applying for the renewal of a licence will be required to undergo a medical examination conducted by specially qualified medical officers appointed by or acting under the authority of the Secretary of State. This examination will be based on the requirements set out in paragraph 90, but certain relaxations thereof may be made at the discretion of the Secretary of State.

Provided that if the person applying for the renewal is temporarily resident in a region distant from official medical centres, the periodical examination which he should normally pass under the conditions of this paragraph may exceptionally, at the discretion of the Secretary of State, be deferred twice for consecutive periods of three months each, on condition that he obtains locally on each occasion a satisfactory medical certificate after having been examined by a qualified medical officer.

93. An applicant who satisfies the medical requirements will receive a medical certificate of acceptance, which must be produced before the licence can be granted.

94. In order to ensure the maintenance of efficiency, every holder of a licence shall be re-examined and pronounced fit before resuming air duties :—

(a) Whenever he has performed a total of 125 hours flying in the capacity of pilot of a flying machine within any period of 30 consecutive days since his last medical examination under these directions.

(b) After illness or accident (including, in the case of licence holders of the female sex, confinement or miscarriage).



95. The date and result of each re-examination, whether for the purpose of renewal of the licence or in consequence of illness or accident, will be recorded on the licence.

96. Applications for official medical examination should be made to The Secretary (D.C.A.), Air Ministry, London, W.C.2.

### C.—Proofs of Competency

97. With reference to paragraphs 3, 4, 5, and 6, of Schedule V to the Order, the proofs of competency required in the case of a person applying for a licence as pilot shall (subject as hereinafter provided) consist of his having passed to the satisfaction of the Secretary of State the respective tests and examinations specified in paragraphs 98 to 107 below,\* and the proofs of competency required in the case of a person applying for a licence as navigator, shall be as specified in paragraph 108 below.

#### PILOTS OF FLYING MACHINES

*Pilot's Licence for private flying machines ("A. Licence").*

98. The tests and examination for a pilot's licence to fly flying machines other than flying machines carrying passengers or goods for hire or reward or being flown for any industrial purpose shall be as follows:—

(1) *Practical Tests.*—In each practical test the candidate must be alone in the flying machine.

(a) Test for altitude and gliding flight: A flight which shall finish with a glide, the engines being cut off at not less than 2,000 feet above the landing or alighting area. The landing shall be made without re-starting the engine and within 150 yards or less of a point fixed beforehand by the official examiners of the test.

(b) Tests of skill: A flight without landing around two posts (or buoys) situated 500 yards apart, making a series of five figure-of-eight turns, each turn reaching one of the two posts (or buoys). This flight shall be made at an altitude of not more than 600 feet above the ground (or water) without touching the ground (or water). The landing shall be effected by:—

(i) Finally shutting off the engine at latest when the aircraft touches the ground (or water).

(ii) Finally stopping the flying machine within a distance of 50 yards from a point fixed by the candidate before starting.

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\* As regards flying experience, see paragraphs 109 to 111.

(2) *Technical Examination*.—(a) Knowledge of rules as to lights and signals, general rules for air traffic, and special rules for air traffic on and in the vicinity of aerodromes open to public use.

(b) A practical knowledge of international air legislation.

(c) A general knowledge of, in so far as they affect the responsibilities of a pilot, the Order, the Directions issued thereunder, and the Notices to Airmen issued by the Air Ministry.

Provided that, for the purpose of the grant of such licences :—

(a) Persons who are qualified as Royal Air Force Pilots may be exempted from the above practical tests.

(b) A Royal Aero Club Certificate, if issued within a period of two years preceding the date of the application for the licence, may be accepted in lieu of the passing both of the above practical tests and of the above technical examination.

*Pilot's Licence for Passenger or Goods Flying Machines*  
(“B. Licence”)

99. The tests and examination for a pilot's licence to fly flying machines carrying passengers or goods for hire or reward or being flown for any industrial purpose shall be as follows :—

(1) *Practical Tests*.—In each practical test, except as otherwise specified, the candidate must be alone in the flying machine.

(a) The same tests as are required under (1) (a) and (b) of paragraph 98 for a private pilot's licence. Candidates already in possession of the latter licence, or of a Royal Aero Club Certificate issued within a period of two years preceding the date of the application for the “B. Licence,” are not, however, required to pass these tests again.

(b) A left hand and right hand spin.

(c) Two cross country or oversea flights of at least 200 miles each.

As regards one of these, the flight shall be made in the same aircraft within eight hours, shall include two obligatory landings (when the machine must come to rest at points, other than the point of departure, fixed beforehand by the examiners) and shall terminate with a landing at the point of departure. During this flight a height of at least 6,500 feet above the point of departure shall be maintained for a total period of one hour.



As regards both flights the candidate will at the time of departure be informed of his route and furnished with the appropriate map. The examiners will decide whether the route has been correctly followed.

(d) A cross country or oversea flight of at least 200 miles with an examiner on board and including three forced landings at points selected by the examiner.\*

(e) General flying for about half an hour with an examiner on board and including five landings.\*

(f) A night flight of at least thirty minutes made between two hours after sunset and two hours before sunrise at a height of at least 1,500 feet above the ground. The aircraft will be required to be equipped with landing lights (lamps or wing tip flares), of an approved type.

(g) A candidate who desires a licence permitting him to fly a type of flying machine equipped with two or more engines will be required to undergo a practical test of his ability to fly and manœuvre such a machine with each engine in turn completely throttled down.

(2) *Technical Examination.*—Candidates will submit themselves when summoned to examination on :—

(a) Flying machines : Theoretical knowledge of the laws of the resistance of the air especially as concerns its effects on wings and tail planes, rudders, elevators and airscrews ; functions of the different parts of the machine and of their controls.

Assembling of flying machines, propellers, under-carriages, rudders, elevators and their controls.

Practical tests on rigging.

(b) Engines : General knowledge of internal combustion engines, and their various functions ; valve gear, carburation, ignition, exhaust.

Characteristics of aero engines and a general knowledge of their construction, adjustment and assembling.

Causes of the faulty running of engines. Fuel and oils. Description of the details of the aero engines used. Adjustments, lubrication, upkeep, disassembling and assembling of the principal parts ; causes of breakdown. Use of throttle and other controls.

Practical tests in running repairs.

(c) Knowledge of instruments prescribed for flying machines.

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\* For tests (d) and (e) the flying machine will be provided by the Secretary of State.

(*d*) Knowledge of rules as to lights and signals, general rules for air traffic, and special rules for air traffic on and in the vicinity of aerodromes open to public use.

Practical knowledge of the special conditions of air traffic and of international air legislation.

A general knowledge of, in so far as they affect the responsibilities of a pilot, the Order, the Directions issued thereunder, and the Notices to Airmen issued by the Air Ministry.

(*e*) Map reading, measurement of distances, calculation of courses, compensation of compasses for deviation and method of determining drift, elementary meteorology

Provided that, for the purpose of the grant of such licences, persons who are qualified as Royal Air Force Pilots may be exempted from all or any of the above tests and from the examination, except as regards the subjects of the examination specified in (*d*) and (*e*). Such exemption may be made conditional upon the satisfactory completion of a special flying test.

### *General*

100. The practical tests specified in paragraphs 98 and 99 respectively shall be carried out within a maximum period of two months.

They may be carried out in any order. They shall be witnessed by properly accredited examiners who will hand over the official reports to the proper authorities.

The practical tests specified in paragraph 98 may be attempted twice during the course of an official flying test. A candidate who fails in any of the practical tests specified in paragraph 99 (1) will be required to carry out a further official flying test, but will be exempted from any part of such a test passed at the first attempt, subject to the provision in the first sentence of this paragraph. In accordance with paragraph 6B of Schedule VI to the Order, a reduction may be made in the fee for an official flying test in respect of any part of such a test from which a candidate is so exempted.

The official reports will give full details of the flights, especially of the landings. The candidates shall furnish, before each test, proof of identity; which the examiners have the right to demand.

A barograph shall be carried on all practical tests, except those specified in paragraph 99 (1) (*b*), (*d*), (*e*) and (*g*), and the graph signed by the examiners shall be attached to their report.



## PILOTS OF BALLOONS

*Private Pilot's Licence*

101. The tests and examination for a pilot's licence to fly balloons other than balloons carrying passengers or goods for hire or reward or being flown for any industrial purpose shall be as follows :—

(1) *Practical Tests*.—The candidate must have completed the following certified ascents :—

- (i) By day : 3 ascents under instruction.  
1 ascent in control under supervision.  
1 ascent alone in the balloon.

(ii) By night : 1 ascent alone in the balloon.

Each ascent shall be of at least two hours' duration.

(2) *Technical Examination*.—(a) Elementary aerostatics and meteorology.

(b) General knowledge of a balloon and its accessories ; inflation ; rigging ; management of an ascent ; instruments ; precautions against cold and high altitudes.

(c) Map reading and use of compass. Knowledge of rules as to lights and signals, general rules for air traffic, and special rules for air traffic on and in the vicinity of aerodromes open to public use.

(d) Practical knowledge of international air legislation.

Provided that, for the purpose of the grant of such licences—

(i) Persons who are qualified as Royal Air Force Kite Balloon Officers or Royal Air Force Airship Pilots may be exempted from the above tests and examination except as regards the examination subjects specified in (c) and (d).

(ii) A certificate issued by any body approved for the purpose may be accepted in lieu of the passing of the above examination if the Secretary of State is satisfied that the qualifications required for the issue of such certificate were at least equivalent to the passing of such examination.

*Pilot's Licence for Passenger or Goods Balloons*

102. The tests and examination for a pilot's licence to fly balloons carrying passengers or goods for hire or reward or being flown for any industrial purpose shall be as follows :—

(1) *Practical Tests*.—The practical tests are the same as those required for a private pilot's licence. Candidates already in possession of the latter licence are not required to pass the practical tests again.

(2) *Technical Examination.*—(a) Aerostatics and meteorology.

(b) Physical and chemical properties of light gases and of materials used in the construction of balloons.

(c) Elementary navigation ; use of compass ; location of position.

(d) General knowledge of a balloon and its accessories ; inflation ; stowage ; management of an ascent ; instruments ; precautions against cold and high altitudes.

(e) Knowledge of rules as to lights and signals, general rules for air traffic, and special rules for air traffic on and in the vicinity of aerodromes open to public use.

(f) Practical knowledge of international air legislation.

(3) The following additional tests and examination will be required in the case of licences covering the flying of fixed balloons :—

*Practical Tests.*—The candidate must have completed six certified ascents on different days in sole control of a fixed balloon and have carried out satisfactorily the management from the ground of three ascents and descents of a fixed balloon on different days (which may, however, be days on which some of the six certified ascents in sole control are carried out).

*Technical Examination.*—(a) General knowledge of a fixed balloon of the type for which the licence is required ; accessories ; inflation ; rigging ; valve adjustments ; management of an ascent ; instruments.

(b) General knowledge of winches and cables.

Provided that persons who are qualified as Royal Air Force Kite Balloon Officers or Royal Air Force Airship Pilots may be exempted from the above tests and examinations, except as regards the examination subjects specified in (e) and (f) of sub-paragraph (2).

## AIRSHIP PILOTS

### *General*

103. There shall be three classes of airship pilot's licences.

The holder of a third class licence is qualified to command any airship of less capacity than 200,000 cubic feet.

The holder of a second class licence is qualified to command any airship of less capacity than 700,000 cubic feet.

The holder of a first class licence is qualified to command any airship.



104. A candidate for an airship pilot's licence must have fulfilled the conditions required for a pilot's licence to fly balloons.

### *Third Class Licence*

105. The tests and examination for a third class licence shall be as follows:—

(1) *Practical Tests*.—(a) Twenty certified flights (three of which shall be by night) in an airship, each flight being of at least one hour's duration. On at least four of these flights the candidate must have handled the airship himself under the supervision of the commanding officer of the airship, including ascent and landing, during the whole flight if the duration thereof does not exceed four hours, and during at least four hours if the flight is of longer duration.

(b) One flight on a predetermined course of at least 70 miles, terminating with a night landing, and made with a duly authorised inspector on board.

(2) *Technical Examination*.—(a) Aerostatics and meteorology.

(b) Physical and chemical properties of light gases, and of materials used in the construction of airships.

(c) General theory of airships.

(d) Dynamic properties of moving bodies in air.

(e) Elementary knowledge of internal combustion engines.

(f) Elementary navigation ; use of the compass ; location of position.

(g) Inflation ; stowage ; rigging ; handling ; controls and instruments.

(h) Knowledge of rules as to lights and signals, rules of the air, and rules for air traffic on and in the vicinity of aerodromes.

(i) Practical knowledge of international air legislation.

Provided that persons who are qualified as Royal Air Force Airship Pilots may be exempted from the tests and examination for a third class licence except as regards the examination subjects specified in (h) and (i).

### *Second Class Licence*

106. The tests and examination for a second class licence shall be as follows:—

(1) *Practical Tests*.—To be eligible for a second class licence a candidate must be holder of a third class licence and have at least four months' service as a third class pilot on an airship, and also have completed at least 10 flights as third class pilot in an airship of capacity above 200,000

cubic feet, on which he has handled the airship himself, including ascent and landing, under the supervision of the commanding officer of the airship, during the whole flight if the duration thereof does not exceed four hours, and during at least four hours if the flight is of longer duration.

(2) *Technical Examination*.—Advanced knowledge of the subjects required for a third class licence.

#### *First Class Licence*

107. The tests and examination for the first class licence shall be as follows:—

(1) *Practical Tests*.—To be eligible for a first class licence a candidate must be holder of a second class licence, have at least two months' service as a second class pilot on an airship, and also have completed at least five flights as second class pilot of an airship of greater capacity than 700,000 cubic feet, on which he has handled the airship himself, including ascent and landing, under the supervision of the commanding officer of the airship, during the whole flight if the duration thereof does not exceed four hours, and during at least four hours if the flight is of longer duration. Each flight must be at least of one hour's duration with a minimum of 15 hours for the five flights.

(2) *Technical Examination*.—As stated above for a second class licence.

Provided that persons who are qualified as Royal Air Force Airship Pilots and have commanded airships of greater capacity than 200,000 cubic feet, may be exempted from the tests and examination for a first class licence except as regards the examination subjects specified in (h) and (i) of paragraph 105 (2).

#### NAVIGATORS

108. (1) There shall be two classes of licences to navigate aircraft.

(2) A candidate for a second class licence to navigate aircraft will be required to produce proofs of competency in the practice and theory of the subjects specified in Schedule A below. He will also be required to produce proof of having had at least two years' air experience, during which at least 300 hours must have been spent in the air.

(3) A candidate for a first class licence to navigate aircraft will be required to produce proofs of competency in the practice and theory of the subjects specified in Schedule B below. He will also be required to produce proof of having had at least four years' air experience, during which at least 600 hours must have been spent in the air, not less than 100 hours of this being experience of navigation in the air and not less than 15 hours being air experience in night flying.



(4) In this paragraph the expression "air experience" means experience as an operative member of the crew of an aircraft.

#### *Schedule A*

(i) Form of the earth ; its divisions and their notation ; mathematical calculation of the various elements by plane trigonometry to obtain course and distance.

(ii) Maps and charts ; how to read and use them ; practical properties of the common forms of projections.

(iii) Compasses ; their construction, use, and adjustment ; elementary principles of earth's magnetism.

(iv) Flight by dead reckoning ; with the use of instruments for the measurement and calculation of the elements of the triangle of velocities.

(v) Navigation by radiogoniometry ; methods of fixing the position of an aircraft, with the application of the necessary corrections.

(vi) International air legislation ; regulations for the prevention of collisions at sea ; publications for the assistance of navigators.

(vii) Signalling ; semaphore, flashing, and international code flags.

(viii) Meteorology ; knowledge of meteorological elements and observations ; arrangements for the issue of meteorological reports for aviation ; principles of forecasting ; construction and interpretation of synoptic charts ; climatology.

#### *Schedule B*

(i) Form of the earth ; as in Schedule A (i) with the addition of mathematical calculation of various elements by spherical trigonometry (great circle courses and distances).

(ii) Maps and charts ; as in Schedule A (ii) with the addition of the principles of construction of the common forms of projections.

(iii) Tides ; elementary theory and prediction by the aid of tables.

(iv) Compasses, as in Schedule A (iii) ; more advanced knowledge.

(v) Flight by dead reckoning, as in Schedule A (iv).

(vi) Navigation by radiogoniometry, as in Schedule A (v).

(vii) International air legislation, etc., as in Schedule A (vi).

(viii) Signalling, as in Schedule A (vii).

(ix) Astronomical navigation ; various methods of fixing the position of an aircraft, with the use and care of tables, diagrams, and instruments for the solution of this problem ; knowledge of the mathematics involved.

(x) Meteorology as in Schedule A (viii); more advanced knowledge.

*Note.*—The arrangements of subjects in Schedules A and B above is not necessarily that adopted in the examination where two or more subjects may be grouped into one paper.

#### **D.—Flying Experience, Etc.**

109. As regards Private Pilots' Licences for flying machines:—

(a) An applicant for the issue of a licence will be required to produce satisfactory evidence that he has carried out not less than three hours' solo flying during the twelve months preceding the date of the application. The evidence normally required for this purpose will consist of the production of a Pilot's Log Book recording such flying, or of a certificate issued by a responsible authority or person approved for the purpose by the Secretary of State.

(b) An applicant for the renewal of a licence will be required to produce in respect of the preceding twelve months the same evidence as is mentioned in subparagraph (a), or in default thereof to carry out satisfactorily the following practical flying tests under the observation of an official observer appointed by the Royal Aero Club, or of some person approved for the purpose.

(i) To execute three figure-of-eight turns, and

(ii) To carry out three landings, finally stopping the aircraft on each occasion within a distance of 50 yards from a point fixed by the applicant before starting.

110. As regards pilot's licences for passenger or goods flying machines:—

(a) The maximum period for which an applicant for the issue or renewal of a licence may not have flown but yet may be considered to have recent reasonable flying experience is six months.

(b) An applicant for the issue of a licence will be required to produce proof that, during the preceding two years, he has carried out as pilot in sole charge of a flying machine at least 100 hours' flying and at least 30 landings. Persons who are qualified as Royal Air Force pilots may, however, be exempted from this requirement if they have passed the practical tests specified in (d) and (e) of paragraph 99 (1) and, if required, that specified in (f) of that paragraph.



(c) A licence will be granted only for such types of flying machines as the applicant can produce evidence of his ability to fly. A licence may, however, be extended to cover further types on production of evidence of the holder's ability to fly those types.

(d) An applicant for the renewal of a licence will be required to produce proof of recent reasonable flying experience on the class of flying machines for which the renewal is required, or, failing such proof, to undergo practical tests.

111. As regards pilot's licences for passenger or goods balloons—

(a) The maximum period for which an applicant for the issue or renewal of a licence may not have flown, but yet may be considered to have recent reasonable flying experience is twelve months.

(b) An applicant for the issue of a licence will be required to produce proof that he has carried out, in sole control of the balloon, ten flights each of which must have been of at least two hours' duration.

(c) An applicant for the renewal of a licence will be required to produce proof of recent reasonable flying experience, or, failing such proof, to undergo practical tests.

112. With reference to proviso (b) to Art. 3 (1) of the Order and proviso (c) to Art. 4 (1) thereof, a flying machine may be flown by a person not holding a pilot's licence for flying machines for the purpose of becoming eligible for the issue of such a licence, provided that the following conditions are complied with :—

(i) The flight must start from, take place within three miles of, and finish at, a licensed aerodrome, a Royal Air Force aerodrome, or an aerodrome under the control of the Secretary of State ;

(ii) Before the flight is commenced, notice that it is being undertaken for the purpose stated above must be given to the person in charge of the aerodrome from which the flight starts.

(iii) No passengers may be carried.

### **SECTION XIII.—MASTER PILOT'S CERTIFICATE (FLYING MACHINES)**

113. With reference to paragraph 5A of Schedule V to the Order, applications for the issue of master pilots' certificates for flying machines should be made to the Secretary (D.C.A.), Air Ministry, London, W.C.2, by whom application forms will be supplied on request.

114. Master pilots' certificates will be issued either for flying machines or for marine flying machines.

115. The qualifications required in order to obtain a master pilot's certificate are as follows:—

(1) The applicant (a) must be the holder of a current pilot's licence to fly flying machines carrying passengers or goods for hire or reward or being flown for any industrial purpose ("B licence") issued under the Order, (b) must have held such a licence for at least five years, and (c) during those five years must have flown for at least 1,000 hours as pilot of civil aircraft.

(2) His flying experience as pilot of civil aircraft must have included:—

(i) 200 flying hours on either (a) single-engined flying machines of at least 300 horse power, or (b) multi-engined flying machines, but so that at least 100 hours shall have been on multi-engined machines, and also so that the 200 hours shall have been wholly on land flying machines or wholly on marine flying machines according as to whether the application is for a certificate for land or for marine flying machines; and

(ii) Twenty cross country or oversea flights, each of a minimum duration of one hour and both commenced and completed at night.

(3) He must be the holder of a current second class or first class licence to navigate aircraft issued under the Order.

116. In place of any of the above qualifications the Secretary of State may accept other qualifications which appear to him to be substantially equivalent.

117. A master pilot's certificate will not require to be renewed.

#### SECTION XIV.—AUTHORITY TO GIVE INSTRUCTION IN FLYING

118. With reference to Article 9A of the Order, applications for authority to give instruction in flying should be made to the Secretary (D.C.A.) Air Ministry, London, W.C.2, by whom copies of application forms will be supplied on request.

119. Applicants for such authority will be required to have passed an examination (which may include practical tests) held by the Secretary of State, or approved by him for the purpose. Particulars of such examinations may be obtained from the Secretary (D.C.A.), Air Ministry, London, W.C.2.



120. Authority to give instruction in flying will not be granted if the Secretary of State is not satisfied that the applicant is a fit and proper person to be granted such authority.

### **SECTION XV.—LICENSED AERODROMES**

121. With reference to Article 7 of the Order, applications for aerodrome licences should be made to the Secretary (D.C.A.) Air Ministry, London, W.C.2, by whom application forms will be supplied on request.

122. Licensed aerodromes are divided into two main categories :—

(a) Aerodromes licensed for use only by the licensee and by individuals specifically authorised by him.

(b) Aerodromes licensed for public use.

123. Aerodromes are licensed either for all types of aircraft or for certain specified types.

124. An aerodrome licence may be granted for any period up to a maximum of twelve months, and on each occasion of renewal, may be renewed for a period not exceeding twelve months.

125. The licensee shall obtain before any work is commenced, the approval of the Secretary of State to any proposed alterations or additions to a site for which an aerodrome licence has been granted, where such alterations or additions may affect the safety of aircraft using the aerodrome.

In particular, where it is proposed to erect buildings or structures, or alter the area of ground occupied by and/or the height above ground of existing buildings or structures; a plan on a scale of 1/2500 shall be rendered to the Secretary (C.A.2), Air Ministry, clearly indicating the new area occupied, or the alteration of area, if any, together with full particulars of the height above ground of each such new or altered building or structure. Failure to obtain such approval will render the licence liable to be withdrawn.

126. Adequate first-aid appliances must be kept at all licensed aerodromes.

### **SECTION XVI.—DROPPING OF ARTICLES FROM AIRCRAFT**

127. With reference to Article 13 of the Order :—

(1) Chemical substances dropped for the purpose of dusting or spraying crops from aircraft flying within Great Britain and Northern Ireland shall be dropped only from aircraft which comply with the following conditions :

- (a) The aircraft shall be equipped with appliances or apparatus suitable for the operation of dusting or spraying crops.
- (b) The classification of the aircraft on its certificate of airworthiness, as provided in paragraphs 37 to 41 above, shall be such as permits the use of the aircraft for the purpose of dusting or spraying crops.
- (2) The dropping of the following articles is permitted :
  - (a) Smoke-producing or other apparatus or material dropped for the purpose of navigating an aircraft, where the approval of the Secretary of State to the type of apparatus and method of use has previously been notified.
  - (b) Message bags and apparatus for dropping articles to the ground, and articles so dropped, where the approval of the Secretary of State to the type of apparatus, method of use, and place where the dropping is to take place, has been notified, and subject to any other conditions which may be laid down.

#### SECTION XVII.—GENERAL

128. In these Directions, unless the context otherwise requires :—

“ Secretary of State ” includes, in relation to any purpose of these Directions, any person authorised by the Secretary of State for that purpose.

“ Approved ” means approved by the Secretary of State.

129. A reference in any document to these Directions or to any provisions thereof shall, unless the context otherwise requires, be construed as referring to these Directions as amended by any subsequent Directions for the time being in force.

130. These Directions may be cited as the Air Navigation Directions, 1932 (A.N.D. 11).

131. These Directions shall come into operation on the 1st October, 1932.

LONDONDERRY,

*Secretary of State for Air.*

Air Ministry,

*2nd September, 1932.*